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Case Report

Post-Odontoma autotransplantation of an impacted tooth: A case report

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ABSTRACT

After years of relegation by dental implants, autotransplantation has recently become more popular because of a better understanding of its science. The prognosis of autotransplantation primarily depends upon the presence of an intact alveolar bone at the transplant site and the regeneration of a functional periodontal ligament of the transplant. Replacement of an unsalvaged or a missing tooth by a natural tooth with normal periodontium within a short duration of treatment is the ultimate challenge of autotransplantation. Meanwhile, Platelet Rich Fibrin (PRF) is popular as a biomaterial which helps in the regeneration of bone and periodontal tissues. To improve the prognosis, and also shorten the treatment time in a rare case of autotransplantation of an impacted tooth in a post-odontoma site, we did a two-stage surgical procedure aided by synthetic bone granules *(Biograft)* and PRF. The clinical and radiological findings at 6 months follow-up showed good result and promise.

1. Introduction

The success of autotransplantation has recently become more consistent compared to that of earlier studies owing to a better knowledge of healing mechanisms of the periodontal tissues.[1,2] It scores over osseointegrated implants in many respects. During a short treatment duration, autotransplantation gives the option of replacing the missing tooth with a natural tooth complete with a periodontal ligament and, sometimes, a vital pulp.[3,4] However, the procedure is technique sensitive and strict regard to certain factors is critical for its success.[3] Platelet Rich Fibrin (PRF) is a biomaterial reputed for its manifold applications.[5] PRF functions as a complex regenerative scaffold promoting both tissue-specific alveolar bone and periodontal soft tissue regeneration via progenitor-specific mechanisms.[6] We are presenting a case where PRF and synthetic bone granules *(Biograft)* are used to shorten the treatment duration, as well as improve the treatment outcome in a two-stage procedure

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of transplanting an impacted tooth in the alveolar region previously occupied by an odontoma.

2. Case report

A patient attended the department of Oral and Maxillofacial Surgery, Dental College, RIMS with complains of a missing upper front tooth and a hard swelling above the gum in that region. The patient was a healthy young man with no other systemic or oral health issues. On careful examination, a tip of enamel-like hard tissue slightly protruding at the edentulous gum was visible. A firm protuberance was felt in the labial sulcus beside the labial frenum. In OPG, a radiopaque mass was visible in the alveolar region between 12 and 21, the missing 11 being impacted apical to the pathology as a separate entity (Fig. 1). We decided to transplant the impacted 11 to its proper position in a second stage surgery, after excision of the radiopaque mass in the first surgery. In the first surgery, we placed PRF clot mixed with *Biograft* in the alveolar aspect of the bony defect post-excision of the tumour, later confirmed as compound composite odontoma. The PRF clot was prepared intra-operatively by withdrawing 10 ml of the patient's blood and immediately centrifuging it for 10 mins at 3000 rpm (Fig. 2A). Three months later, a mucoperiosteal flap was raised labially to expose the grafted bone which has healed adequately to receive a single-rooted donor tooth (Fig. 2B). Osteotomy of the graft-repaired alveolar bone was done by sequentially increasing the size of the physiodispenser-driven drills of the *Lifecare Implant* system (Fig. 2B). An acrylic prototype of the donor tooth was fabricated and used during the osteotomy procedure to check the dimension of the recipient "socket" and ensure a loose fit. Small adjustments of the socket dimension was done by a round tungsten carbide surgical bur. The impacted tooth was then exposed and extracted after removing the covering bone (Fig. 2C). It was loosely fitted immediately into the "socket" after trimming the crown for proper orientation in the available space (Fig. 2D). PRF clot was again prepared and then pressed between the fold of a sterile gauze to form a membrane (Fig. 2E). The PRF membrane was then placed on the labial and cervical bone of the transplant and then covered by the Biograft granules (Fig. 2F). The flap was then sutured with a 4–0 silk thread. A periodontal pack was given. The transplant was kept out of incisal contact and splinted with a flexible wire bonded palatally by composite. We kept the splint for 1 month. The tooth was exposed to normal function 10 days after the removal of splint when the slight mobility present became normalised. RCT of the transplanted tooth was done in a single sitting 2 weeks after the transplantation (Fig. 2G). Follow-up was done weekly for 1 month, then at 2 months and 6 months, and hereafter, every 6 months till date. There were no signs of infection at any stage. There was a 1 mm apical migration of the gingival margin from the position achieved at the end of surgery at one month follow-up. The gingival margin has stabilized at 6 months (Fig. 2H and I). The slight mobility and tenderness on percussion present at the time of splint removal normalised gradually. There were no radiological signs of root resorption or bone loss at 6 months follow-up (Fig. 2J).

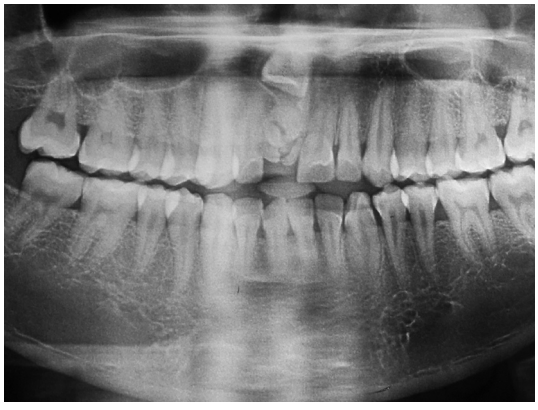

Fig. 1 – Impacted 11 with a radiopaque mass between 12 and 21.

3. Discussion

Many indications of autotransplantation have been identified, but our case which involved transplanting at a site previously occupied by a tumour is new.[3,7] We were presented with an odontoma occupying the space of a missing tooth, with a fully formed impacted tooth located superior to the pathology. The challenge in our treatment plan was in replacing the missing tooth in the post-odontoma site by autotransplantation, within a time frame acceptable to the patient. Our first-stage surgery where we used PRF-*Biograft* ensured healing of the odontoma-related bony defect in 3 months and facilitate an earlier autotransplantation. Placement of the PRF-*Biograft* during the second surgery also probably contributed to the normal pocket depth and the good gingival profile of the transplanted tooth. Comprehensive studies by Q. Li et al. had illustrated the inducing effects of PRF on periodontal progenitor cells, i.e. dental follicle, periodontal ligament and alveolar bone progenitor cells using microscopy and biological assay. Bone graft added to the PRF is also documented to enhance this induction.[8] Periodontal progenitors do not form bone or other mineralized tissues in routine tissue engineering applications on its own.[6] Our uses of PRF-Biograft composite in both the stages were subject to these observations. Splinting periods ranging from 2 weeks to 2 months have been reported by various authors.[1,3,7] We kept the splint for 1 month to compensate the short root of the transplant. A width of 1–2 mm of periodontal ligament of the donor tooth is recommended occlusal to the crest of alveolar bone during placement. Too deep or shallow placements either lead to apical migration of epithelium and bone loss, or long connective tissue attachment.[9] Pulp healing is not expected if the formation of root is complete, with an apical foramen <1 m. In our case, RCT was started at 2 weeks after transplantation as pioneered by researchers.[1,7] Successful outcome of autotransplantation requires due regard to factors like minimising periodontal ligament and cemental damage, extraction technique, indication and timing of endodontic treatment, splinting, antibiotic prophylaxis, approximation of bone and tooth at cervical region, gingival sealing of the tooth against